2015

City of Fresno
Fiber Interoperability

Information Services Department

City of Fresno

Revised 7/27/2015

ISD

Introduction

In today's economy, cities and counties have been faced with many challenges including providing services. Cities, counties and all public agencies have often had the challenge of working "smarter" not "harder" and to be good stewards of taxpayer dollars. In the Greater Fresno Area, multiple agencies have worked together in the spirit of collaboration and for the greater good of their constituents. Working together, they have created a municipal network for sharing data and services.

The network was started with the desire of three agencies to share data. The result was a wide area network connecting multiple agencies within the region. What's notable about this effort is the collaboration between the agencies as well as how the network grew over time. There were many unforeseen needs that arose over time and these challenges were resolved with a great deal of cooperation resulting in success.

Intelligent Transportation System is Built

In 1995, the City of Fresno began efforts to construct an Intelligent Transportation System (ITS) whose main purpose was to enhance and manage the City's transportation system increasing safety, mobility, efficiency as well as reduce automobile pollutants by managing traffic. In 1998, the City was awarded grant funds allowing the City to construct a fiber optic background throughout the city and implement a centralized control mechanism to manage traffic signals. As such, the City of Fresno's Department of Public Works (DPW) moved forward with the planning and construction of the network concentrating on the City's major traffic corridors. Public Works created a comprehensive strategic plan which included connecting 65 traffic signals and over 55 miles of transportation infrastructure.

The main focus of this system was to construct a fiber network for traffic infrastructure – not for data. As the system was built, there was excess capacity in the system that remained unused. As the ITS system was being built and the excess fiber remained unused, no one realized that this system would be essential to future connectivity of the multiple agencies within the area. However, this was about to change.
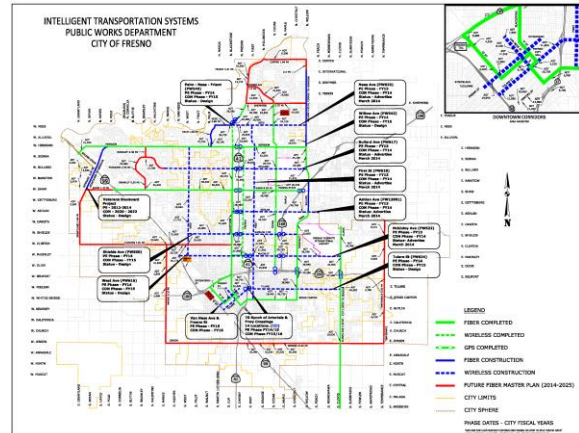

Figure 1: The City of Fresno's Intelligent Transportation System.

E-Government Agreement Established

In 2003, a collaborative effort was being conducted by the City of Fresno, County of Fresno and City of Clovis as the three agencies had been sharing ideas with planning, permitting and GIS. This effort was known as the Fresno Regional e-Government Group. The e-Government Group's main goal was to create a common portal for sharing services. The group desired to share Geographical Information Systems (GIS) data, planning, permitting, licensing and other data. The three agencies became the sponsor of this effort and envisioned a system that would include other agencies as subscribers and could even include use by constituents. The coalition was formalized by a Memorandum of Understanding (MOU) which created a sharing agreement that included provisions for governance and future expectations.

Since the main objectives for the e-Government effort was the ability to share data and services for GIS, permitting, licensing as well as provide a mechanism for e-payments, the main targets for this effort (and the portal) were mainly other cities. The focus was to deliver e-services for the citizen as to reduce the need for the citizen to travel to a city facility in order to do business. However, other uses for this "portal" would arise in parallel with this effort.

The first connection of the e-Government effort was between the City of Fresno and County of Fresno. Since the two agencies were headquartered downtown and they both had fiber infrastructure within the downtown area, it was relatively easy to make a connection. Leveraging this infrastructure, the two agencies connected their respective fiber

networks and began sharing data.   As expected, what was realized by this connection was the sharing of GIS and planning data.

The first unexpected benefit of this fiber connectivity was the ability to share law enforcement data. Since this connection included the Fresno Sheriff's Office as well as the Fresno Police Department, there was an opportunity to share public safety data. As proper security was already being put in place to safeguard each agency's data network, connecting the two law enforcement agencies together did not require much additional effort. This by-product was not part of the e-Government objectives, but it made sense, so the agencies worked together to make the connection a reality. Additionally, it would not be the last unexpected benefit that the agencies would encounter through their collaborative effort.

The biggest challenge in connecting the sponsors of the e-Government Group was to get the City of Clovis connected. Since the main connection point was 10 miles from downtown Fresno and the desire was for a high-speed connection, options were few. Knowing about the City of Fresno's ITS network and that the City of Clovis had a fiber network of its own, the group turned to the ITS network for a possible solution. As such, the ITS was nearing a point where minimal construction was required. Subsequently, construction was completed in October 2005 and the two networks were joined together allowing the City of Clovis the ability to connect with the City of Fresno and the County of Fresno, thus, completing the portal desired by the e-Government Group.

This connection presented another unforeseen benefit to the agencies as it allowed the Clovis Police Department to share data with the County Sherriff's Office and the Fresno Police Department. By this time, the agencies were realizing that other connections could occur from this joint venture and began looking for ways to gain additional value.

A Partnership is Born
The e-Government group was an important collaborative event for the region as the agencies put together an effort to work together, however, due to lack of funding, in January 2010, regular meetings were suspended. While the e-Government Group was dormant, agencies still worked on e-Government systems and the agencies continued to work together on connectivity efforts. The e-

Government effort also marked the beginning of a long term partnership between the City of Fresno's Information Services Department (ISD) and the Department of Public Works (DPW) as the two began working together to utilize the excess fiber of the ITS network for data purposes. Hence, in 2007, the two departments created a Memorandum of Understanding (MOU) of their own allowing ISD the ability to utilize the ITS fiber for data purposes. Public Works also changed the ITS strategic plan in order to include ISD's role in the system. As a result, both agreed to work together as well as to ensure that the fiber was utilized properly in an effort to leverage the system for public benefit.

Even though ISD was able to utilize the ITS fiber network for data purposes, it wasn't always a perfect solution since the ITS network's main purpose was to connect traffic signals to manage traffic. In some cases, additional construction was needed which created funding challenges that would have to be overcome. Nonetheless, from this arrangement, ISD began connecting other city locations such as the City's Budget Office, Redevelopment Agency and Fire Headquarters in 2008. In addition, a connection was implemented for Fresno County of Governments allowing the City of Fresno to become the host of region's 511 information system.
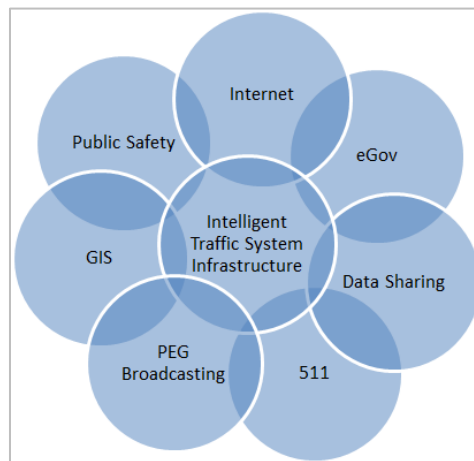

Figure 2: Functions of the Fresno Regional Network.

Regional Collaboration
In 2009, the City of Fresno, City of Clovis, Fresno County Office of Education and Fresno State University began working together to collaborate future connections for the region. Items that were discussed included the connection of more agencies

to the network as well as ensure connectivity with redundancy. These discussions led to future plans such as connecting the Fresno County Office of Education, Fresno State and Fresno City College to the network. The ITS network construction was already near Fresno City College and was soon to be progressing near Fresno State. In addition, the group had been able to identify a feasible connection point that would allow Fresno State to join the network, but the group would have to wait until the ITS fiber network reached that point. The ITS network was about a year from being at that connection point, so the group agreed to continue to collaborate and tackle any other issues while waiting for the completion of the construction or until another solution presented itself.

Clovis Unified Connectivity Needs

In 2010, another unforeseen benefit presented itself. Clovis Unified School District approached both the City of Clovis and the City of Fresno to gain connectivity to the Fresno County Office of Education (FCOE) by means of the fiber network. In working with the Cities of Fresno and Clovis, a fiber path had been identified that would allow connectivity to Clovis Unified's Fiber network -- with one exception, the fiber path existed near FCOE, but none going directly to it. FCOE had connections to the County of Fresno and Fresno Unified, but none to the City of Fresno -- which was needed to connect Clovis Unified. As had been the case with the connection of many other fiber connections, construction would be needed to complete the connection. In this case, however, the needed construction was minor as it only required the implementation of fiber and conduit without the need for boring or trenching. Seeing that this connection would require minimal cost, construction began in December 2010, was completed in March 2011 and the District went live with the link in April 2011. This link would not only connected Clovis Unified to FCOE, it also allow the connection of FCOE to the City of Fresno's network as well as giving Fresno Unified a pathway as they were already connected to FCOE.

Additional planning and construction had commenced in 2013 as a master project between Public Works and Clovis Unified to connect many of the schools of that district that reside in the City of Fresno's city limits. Last mile construction will allow the use of the ITS infrastructure to connect the sites

while preserving the use of the ITS system as intended.

Community Access Media Center CMAC)

In early 2013, fiber connectivity was implemented to the Community Access Media Center (CMAC) covering Fresno and Clovis Areas. CMAC is located in the historic Fresno Metropolitan Museum. Its purpose is to provide Public, Education and Government (PEG) programming as well as maintain a studio for the creation and production of such programming. CMAC is working with the City of Fresno, Fresno Unified, Fresno County Office of Education, the Center for Advanced Research and Technology (CART) and CSU-Fresno. Early connectivity will be between the City of Fresno and CMAC, however, fiber connectivity will also allow CMAC to reach the other PEG partners for future applications.

Other & Future Connectivity Needs

As the Regional effort is never ending, in 2012, Fresno County's data Center was connected to the network allowing less reliance upon Telco based solutions. Also, a short segment was completed that completing the fiber ring for redundancy purposes. In 2014, the connection to Fresno Yosemite International Airport was also completed. This link may allow additional connections in County buildings that reside near the airports. Another City connection soon to join the fiber network is the City's Water Department Headquarters. Construction for this segment will begin in 2015.

As mentioned before, the effort intends to extend to Fresno State (as construction permits) and Fresno City College for data purposes. Other efforts to leverage the fiber network include connecting the Fresno Superior Court as they have expressed interest in utilizing fiber and conduit paths to connect their two downtown facilities. They will most likely not be connected with the other agencies due to the nature of their business, but it is still an opportunity to leverage existing infrastructure to save on costs, thereby, making good use of taxpayer dollars.

Concluding Thoughts

Although the overall effort has been very successful, what's astonishing is the amount of collaboration and improved relations that has been realized by the neighboring agencies. What began as an effort to

share GIS and permitting data by three agencies has evolved into a multi-agency coalition. As such, new relationships had been established with educational institutions (Fresno State, Fresno Unified, Clovis Unified and the Fresno County Office of Education), while existing relationships were strengthened.

What's more, all agencies involved had met challenges as a collective unit with a "can-do" demeanor. Not one agency showed any resistance to any challenge and, in fact, have worked together to find solutions rather than to put up road blocks. Even with tough economic times, the group managed to find ways to accomplish goals and have worked together for the greater good of the area.

Much has been accomplished, but there's more work to do. What has been created by the agencies is likened to a government "cloud" where connectivity exists for hosted services.

In creating this network and government cloud, the coalition will continue to explore ways to leverage the existing network as well as investigate ways in which additional services can be implemented.

Two such opportunities that have been discussed are disaster recovery and the further availability of planning and permitting software. Other services that have been discussed are ERP, CRM, teleconferencing as well as distance learning.

The effort of the agencies within the Greater Fresno Area is an example that government agencies *can* work together for a common goal. The coalition that has been formed between cities, counties, school districts and other entities shows that collaboration and successes are attainable between differing agencies. Going forward, this coalition will continue to move forward tackling future challenges and finding new, better and "smarter" ways to work together.
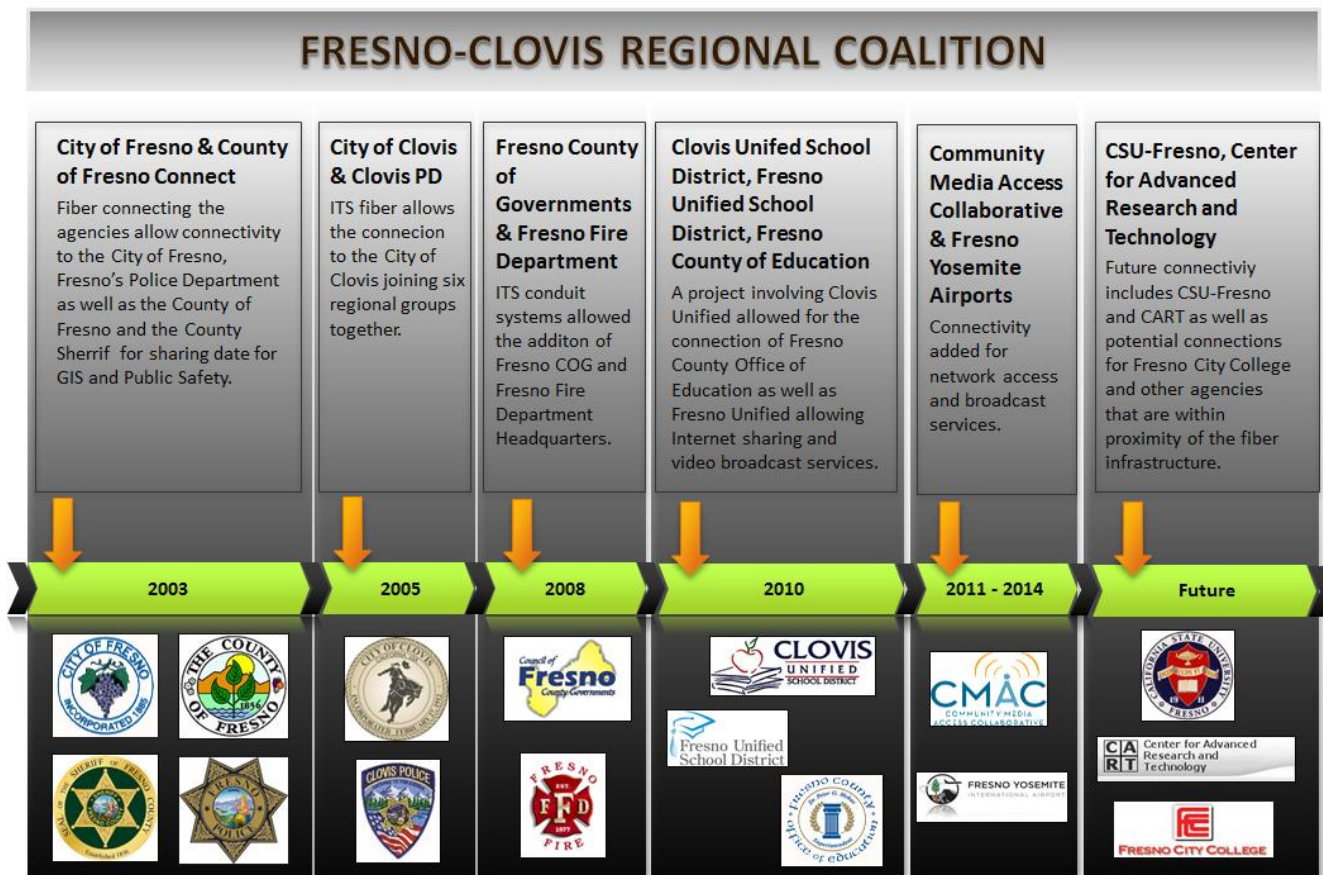

Figure 3: Implementation Timelines (Revised 9/4/2014)